
Suisun Marsh Monitoring Program Channel Water Salinity Report

Reporting Period: December 2004

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1. SUISUN MARSH MONITORING STATIONS AND REPORTING REQUIREMENT

As per SWRCB Water Rights Decision 1641, dated December 29, 1999, and previous SWRCB decisions, the California Department of Water Resources (DWR) is required to provide monthly channel water salinity compliance reports for the Suisun Marsh to the SWRCB. Conditions of channel water salinity in the Suisun Marsh are determined by monitoring specific electrical conductivity. Specific electrical conductivity is referred to in the reports as "specific conductance". The locations of all listed stations are shown in Figure 5.

The monthly reports are submitted for October through May each year in accordance with SWRCB requirements. The reports are required to include salinity data from the stations listed below:

Station Identification	Station Name	General Location	Classification
C-2*	Collinsville	Western Delta	Compliance Station
S-64	National Steel	Eastern Suisun Marsh	Compliance Station
S-49	Beldon's Landing	North-Central Suisun Marsh	Compliance Station
S-42	Volanti	North-Western Suisun Marsh	Compliance Station
S-21	Sunrise	North-Western Suisun Marsh	Compliance Station

Data from the stations listed below are included in the monthly reports to provide information on salinity conditions in the western Suisun Marsh.

Station Identification	Station Name	General Location	Classification
S-97	Ibis	Western Suisun Marsh	Monitoring Station
S-35	Morrow Island	South-Western Suisun Marsh	Monitoring Station

Information on Delta outflow, area rainfall, and operation of the Suisun Marsh Salinity Control Gates are also included in the monthly reports to provide information on conditions that may affect channel water salinity in the Marsh.

* Throughout the report, the representative data from nearby USBR station is used in lieu of data from station C-2.

2. Monitoring Results

2.1 Channel Water Salinity Compliance

During the month of December, 2004, salinity conditions at all five compliance stations are in compliance with channel water salinity standards of SWRCB (Table 1). Compliance with standards for the month of December was determined for each compliance station by comparing the progressive daily mean of high-tide specific conductance (SC) with respective standards. The standard for compliance stations C-2, S-64, S-49, S-42 and S-21 were 15.5 mS/cm during December 2004. Table 1 lists monthly mean high-tide SC at these compliance stations. The progressive daily mean (PDM) is the monthly average of both daily high-tide SC values. The mathematical equation is shown below.

$$\text{PDM} = \frac{\sum \text{daily average of high tide SC}}{\# \text{ days of the month}}$$

2.2 Delta Outflow

The December Delta outflow ranged between 2,200 cfs to 45,000 cfs. Outflow was below 5,000 cfs until December 8. Thereafter outflow increased and peak to about 27,500 cfs on December 12. Between December 13 to December 17, outflow dropped off significantly and remained below 6000 cfs thereafter until December 28. The second major outflow increase occurred between December 28 to December 31. The year ended with the largest outflow peaked at 45,000 cfs. The monthly Delta outflow is represented by the mean Net Delta Outflow Index (NDOI). The NDOI is the estimated daily average of Delta outflow. Mean NDOI for December is listed below:

Month	Mean NDOI (cubic feet per second)
December	9,975

2.3 Rainfall

Total monthly rainfall at the Waterman Gauging Station in Fairfield during December 2004 doubled the previous month November total and is listed below: The largest precipitation occurred on December 8 with the daily total of 1.97 inches.

Month	Total Rainfall (inches)
December	6.66

2.4 Suisun Marsh Salinity Control Gate (SMSCG) Operations

Operations and flashboard/boat lock installations at the SMSCG during December 2004 is summarized below. The gates continued to be operated to control salinity with boat lock open configuration per NOAA request for the remainder of the control season.

Date	Gate status	Flashboards status	Boat Lock status
December 1-31	3 gates operating	Installed	Open

3. Discussion

3.1 Factors Affecting Channel Water Salinity in the Suisun Marsh

Factors that affect channel water salinity levels in the Suisun Marsh include:

- delta outflow;
- tidal exchange;
- rainfall and local creek inflow;
- managed wetland operations; and,
- operation of the SMSCG and flashboard configurations.

3.2 Observations and Trends

3.2.1 Conditions during the Reporting Period

During December 2004, salinity levels at Collinsville(C-2), National Steel(S-64), Beldons (S-49), Sunrise Club(S-21), and Volanti(S-42), ranged between 6.0 mS/cm and 12.0 mS/cm as shown in Figure 1. At the two monitoring stations(S-97 and S-35) salinity levels ranged from 11.0 mS/cm and 15.0 mS/cm as shown in Figure 2. Salinity levels at Collinsville and Beldons were opposite of each other in the early part of December and is probably a result of phase change in the tide and exchange of salt interaction within the tidal prism. Gate operations and outflow had no drastic change in early December, thus these two factors are more than likely not the cause behind the opposite salinity pattern observed at Collinsville and Beldons. After the first round of precipitation events in mid-December, salinity levels at both compliance and monitoring stations began to drop and continued to decrease to the end of December with the second round of precipitation events that occurred in the last week of December.

On the western side of the marsh, Ibis salinity level was lower and decreased at a faster rate than Morrow due to upstream creek runoffs. All stations both eastern and western stations salinity levels were well below the monthly standards.

3.2.2 Comparison of Reporting Period Conditions with Previous Years

Monthly mean high-tide SC at the compliance and monitoring stations for December 2004 were compared with means for those months during the previous nine years (Figure 4).

Means salinity pattern of all compliance and monitoring stations are similar to that of 2002, but somewhat higher in magnitude, except at C-2 where the site is about the same and at S49 salinity level was a bit lower to that of 2002 at the end of the month. Compared to previous nine years, December 2004 salinity levels were ranked third in high Specific Conductance.

Table 1**Monthly Mean High Tide Specific Conductance at Suisun Marsh
Water Quality Compliance Stations****December 2004**

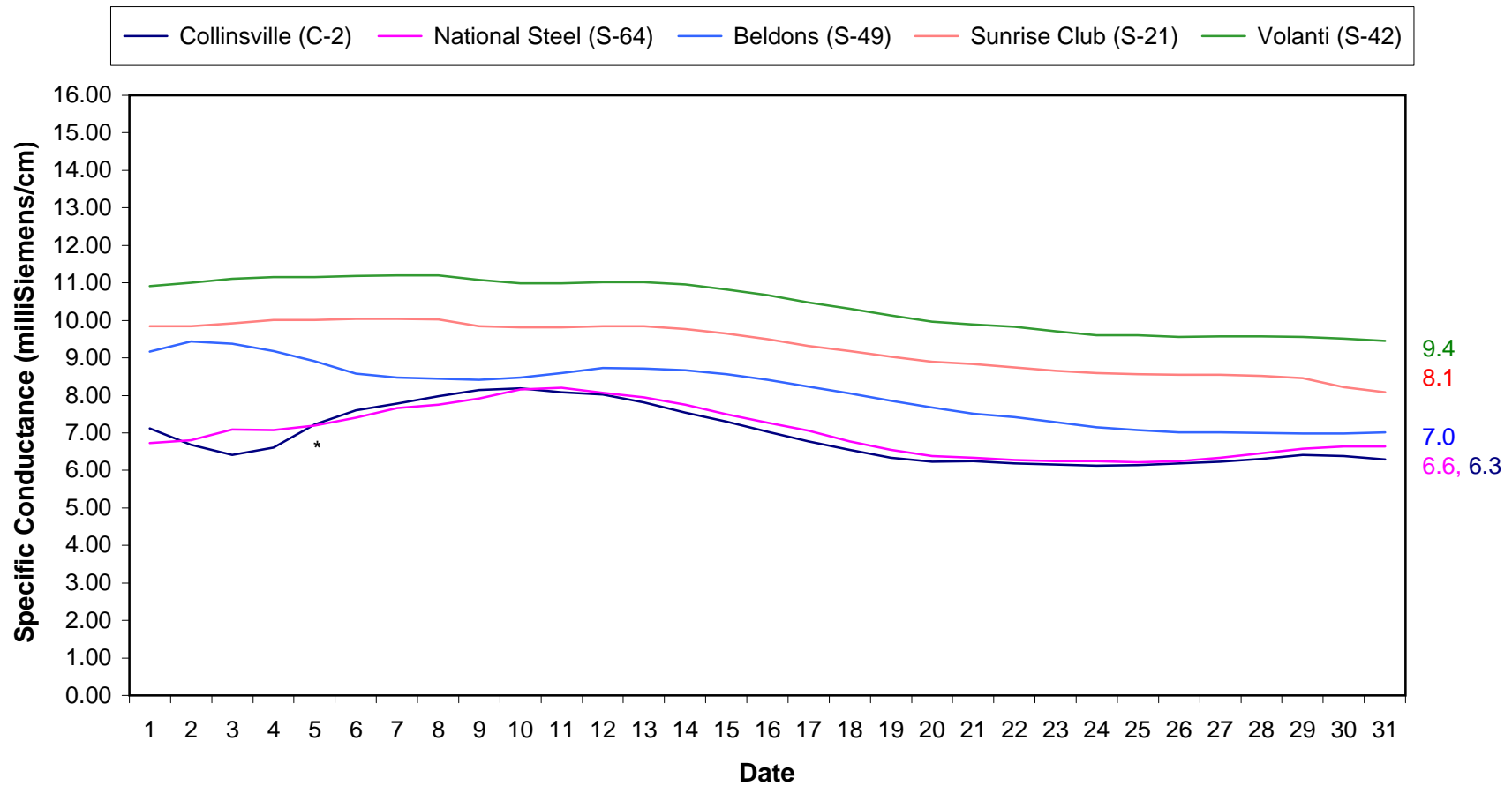
Station	Specific Conductance (mS/cm)*	Standard	Standard meet?
C-2**	6.3	15.5	Yes
S-64	6.6	15.5	Yes
S-49	7.0	15.5	Yes
S-42	9.4	15.5	Yes
S-21	8.1	15.5	Yes

*milliSiemens per centimeter

**The representative data from nearby USBR station is used in lieu of data from station C-2.

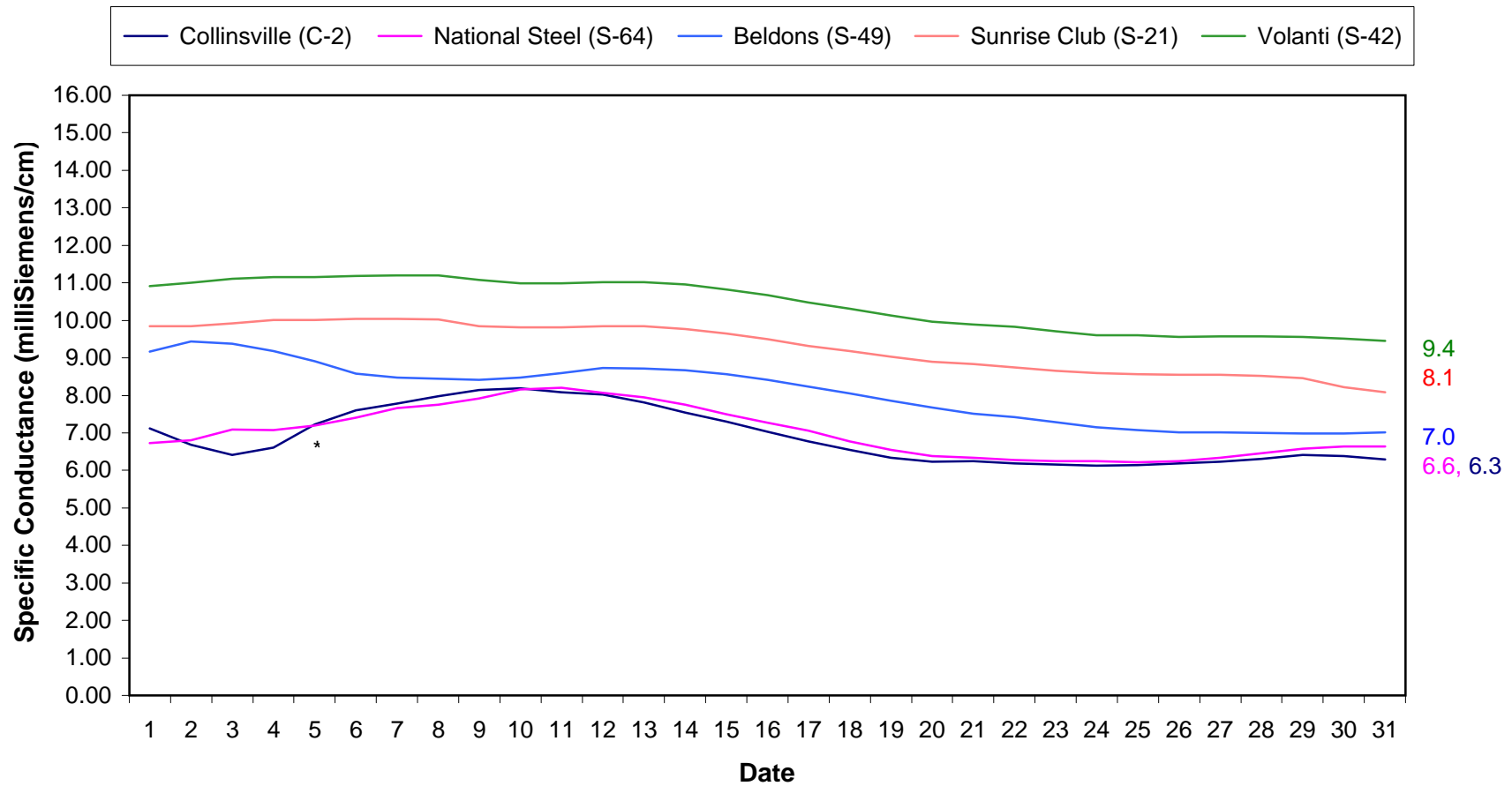
**Figure 1. Suisun Marsh Progressive Mean High Tide Specific Conductance
December 2004**

Standard = 15.5 mS/cm

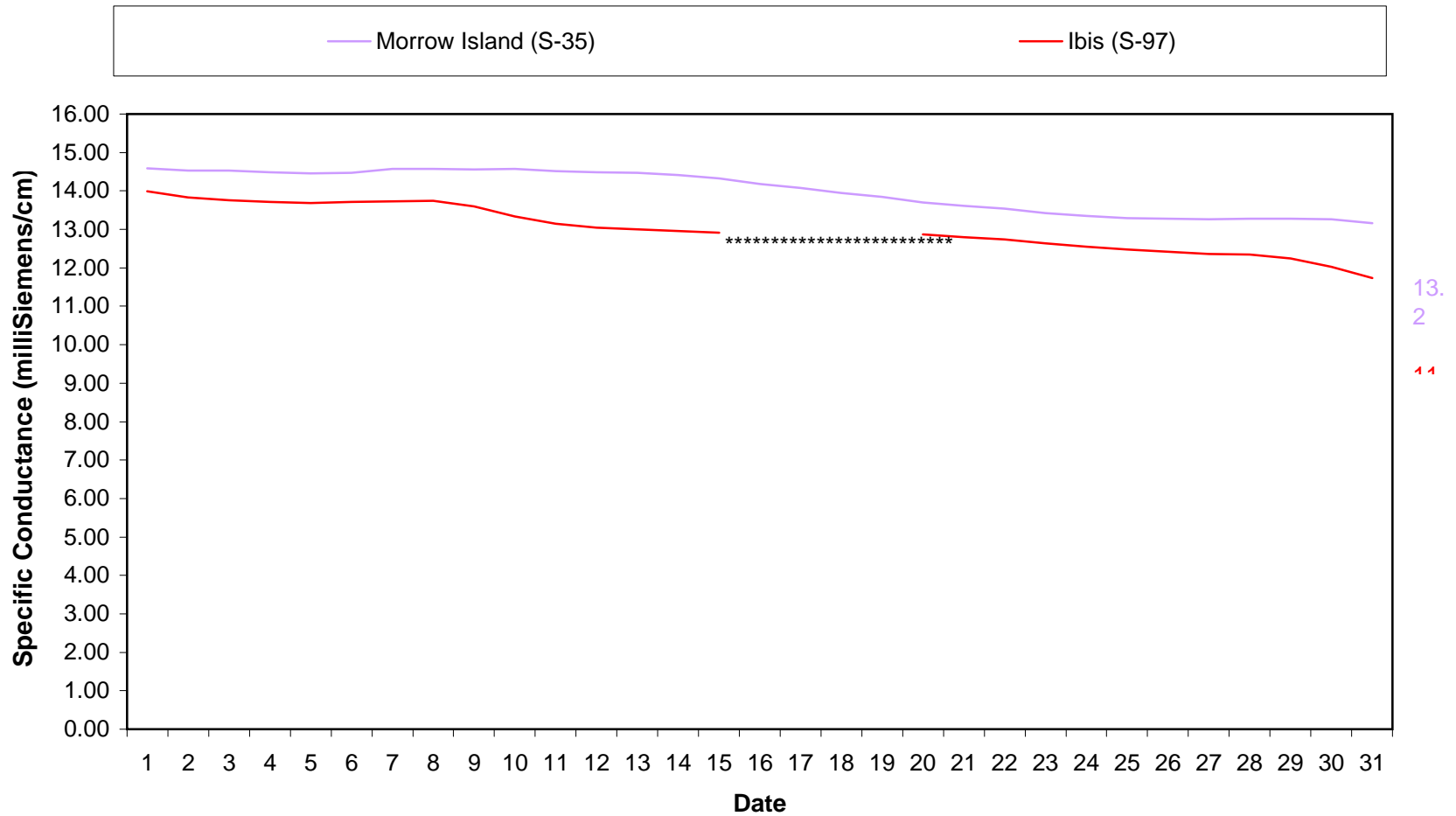


**Figure 1. Suisun Marsh Progressive Mean High Tide Specific Conductance
December 2004**

Standard = 15.5 mS/cm

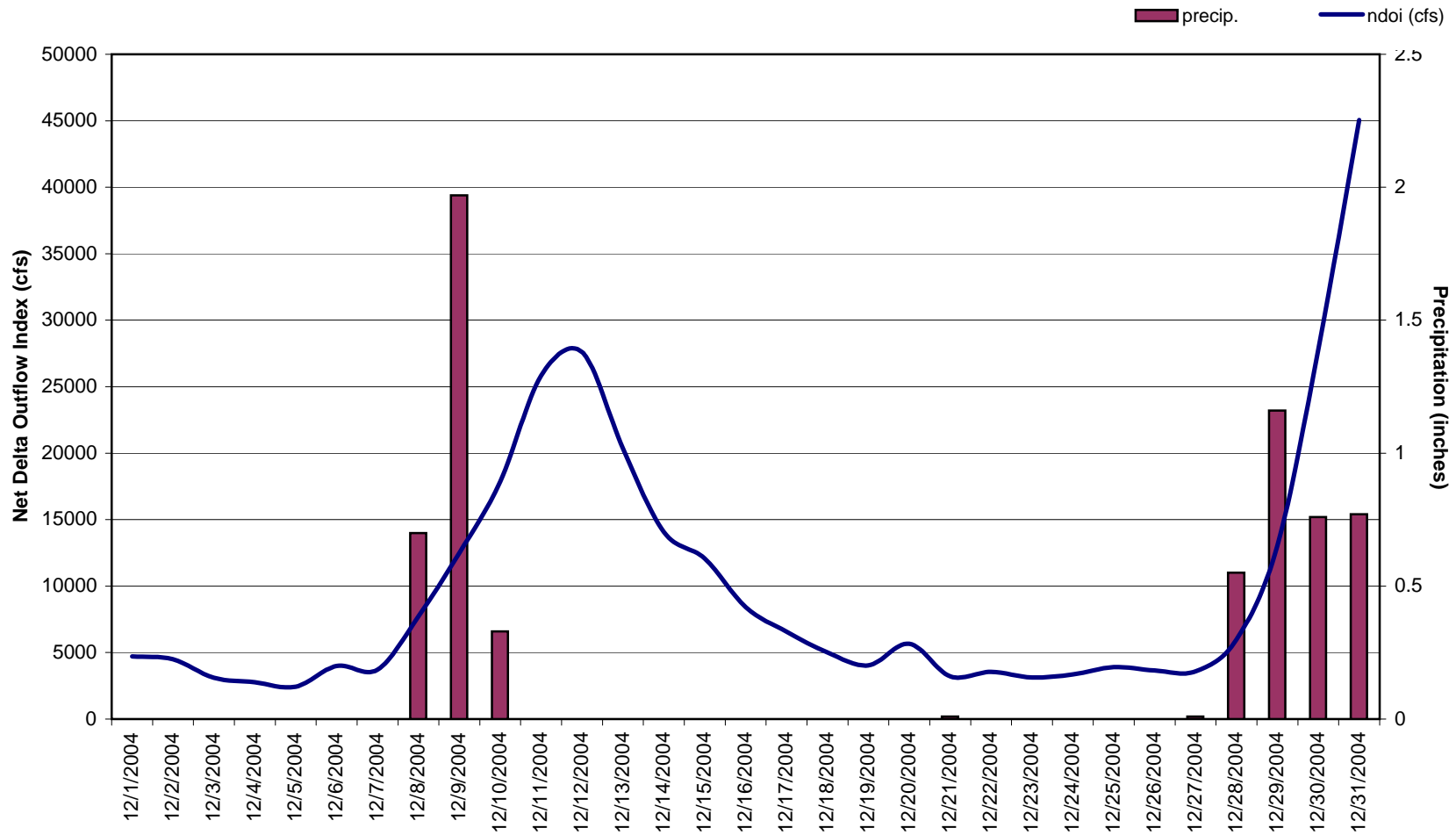


**Figure 2. Suisun Marsh Progressive Mean High Tide Specific Conductance
December 2004**



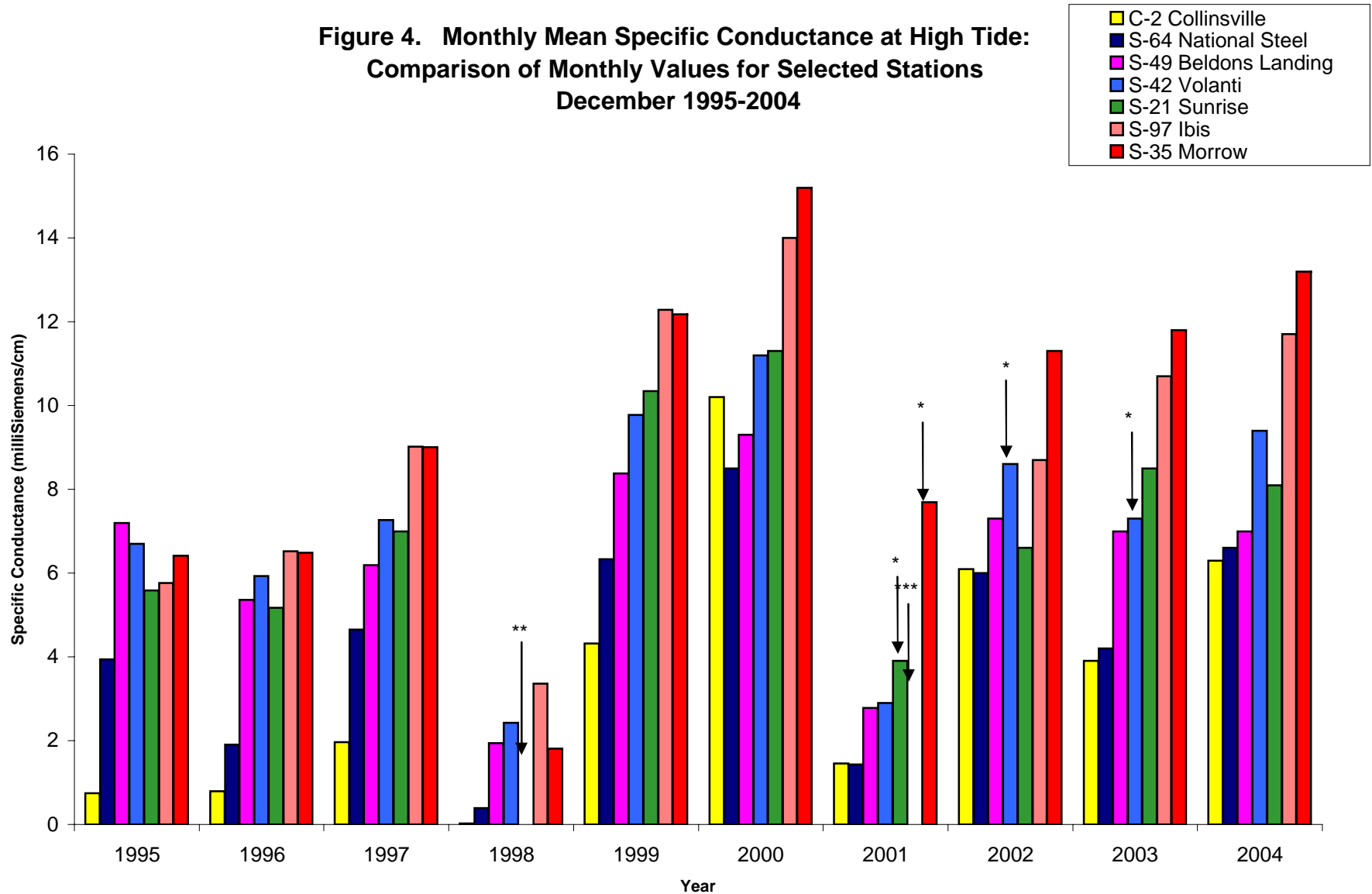
***** S-97 data missing due to equipment

**Figure 3. Daily Net Delta Outflow Index and Precipitation*
December 2004**



*Preliminary DWR, O&M Delta Outflow data and precipitation from Fairfield Water Treatment Plant.

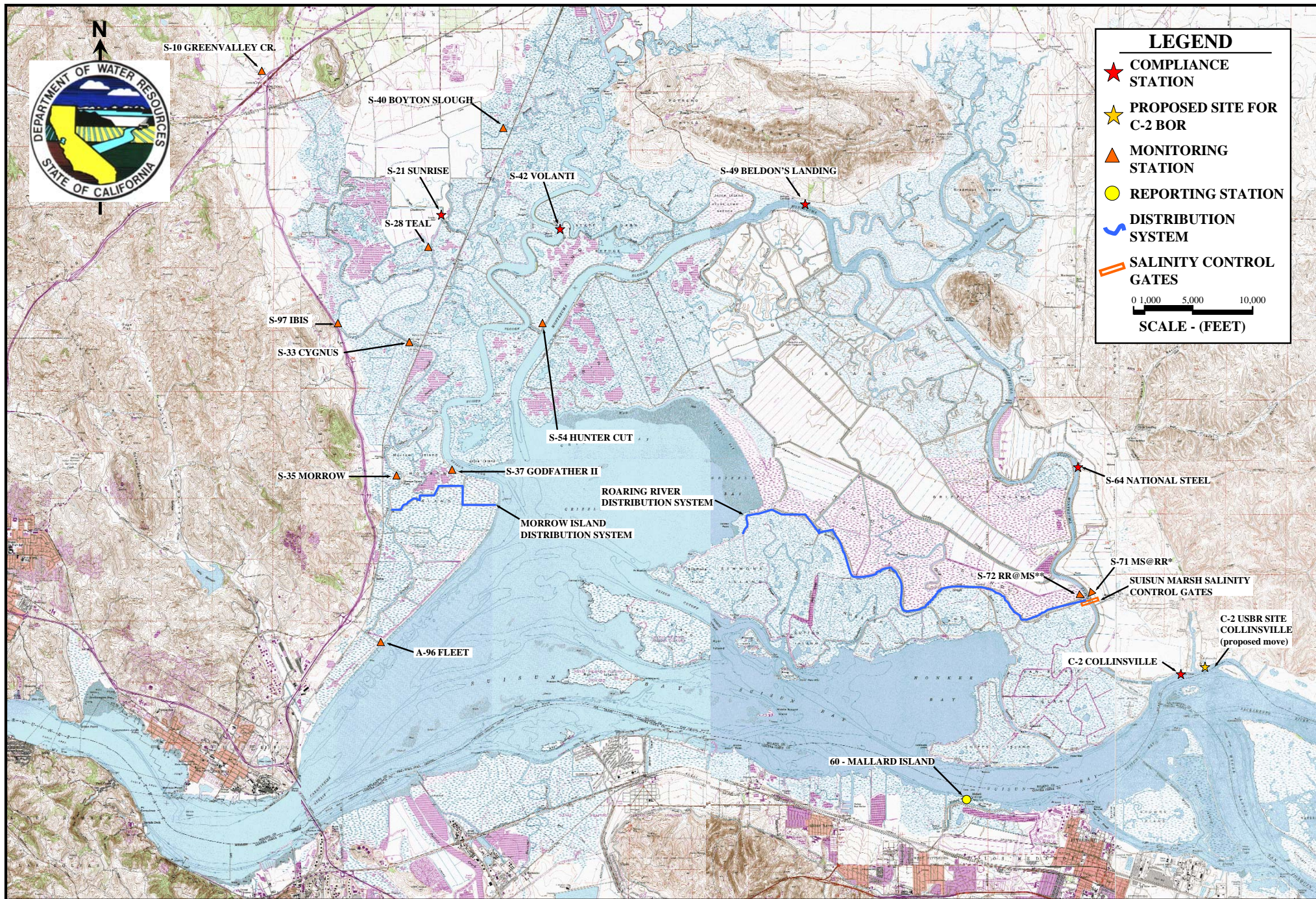
**Figure 4. Monthly Mean Specific Conductance at High Tide:
Comparison of Monthly Values for Selected Stations
December 1995-2004**



* Data does not reflect partial month. Data collection was interrupted before the end of the month due to equipment failure.

** Data was not obtained due to power problems at the station.

*** Data was not obtained due to equipment failure.



SUISUN MARSH PROGRAM WATER QUALITY MONITORING AND CONTROL FACILITIES